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JUNE 11, 1949

SCIENCE NEWS LETTER

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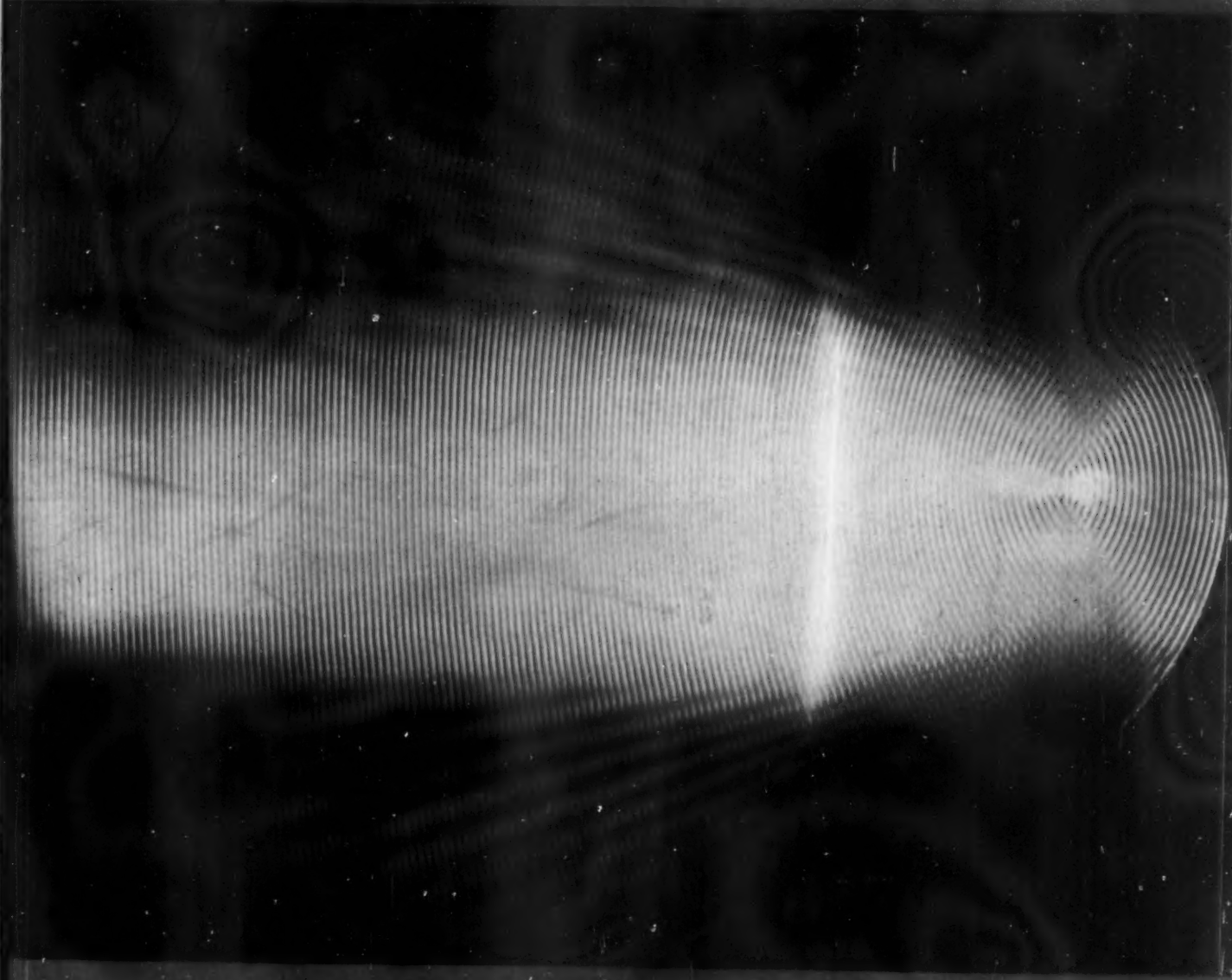
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Sound Seen

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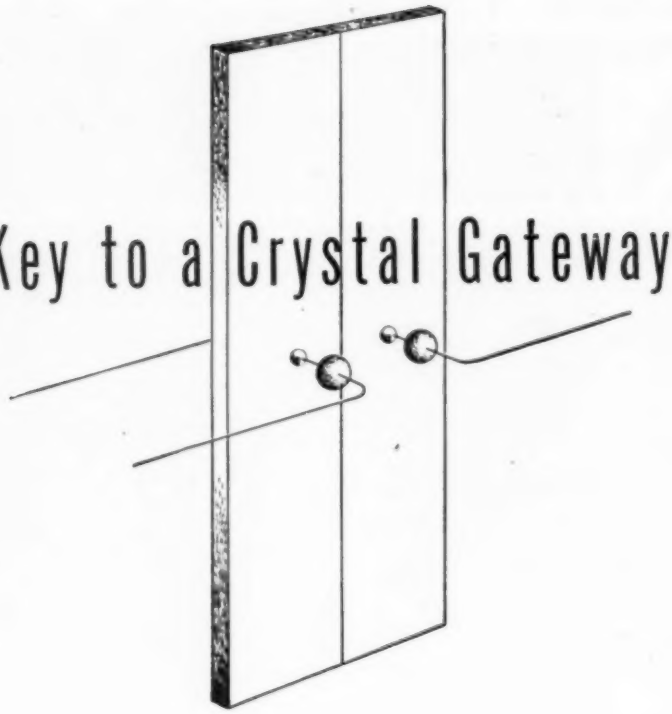
Above is a coaxial circuit crystal in its glass enclosure. At right the crystal is shown, 3½ times actual size, with connecting wires soldered in position. Weights on wires reflect energy back into crystal, so cut losses.

Key to a Crystal Gateway



How would you solder a wire to a crystal? This must be done for most of those wafer-thin plates of quartz used in electrical circuits. They play a big part in the myriad-channel telephone system that utilizes coaxial cables.

This is how Bell Laboratories scientists solved the problem: A spot of paste containing silver is deposited on the crystal and bonded to it by oven heat. The crystal is then vapor-plated with a thin layer of silver. Then a fine wire is soldered to the spot by a concentrated blast of hot air. The result is a rugged electrical connection to the surface of the crystal which does not interfere with its vibrations.

Sealed in glass tubes, the crystals are precise and reliable performers in the telephone system. Each is a crystal gate to a voiceway, separating *your* conversation from the hundreds of others which may be using a pair of coaxial conductors, at the same time.

This spot of paste, this tiny wire, this puff of air are among the tremendous trifles which concern Bell Telephone Laboratories in finding new ways to improve your telephone service.

BELL TELEPHONE LABORATORIES

Exploring and Inventing, Devising and Perfecting, for Continued Improvements and Economies in Telephone Service

MEDICINE

New Way To Stop Acidity

A radioactive phosphorus coated balloon which is swallowed and then inflated to the size of the stomach suggests new aid for ulcer patients.

➤ FUTURE treatment for stomach ulcers may make use of a balloon covered with radioactive phosphorus. The balloon would be deflated, swallowed and then inflated to stomach size. Left in place a few hours, its radioactivity would stop production of acid in the stomach and thus favor healing of the ulcers.

Preliminary tests looking toward this type of treatment appear in a report by Dr. Norman Simon of Mount Sinai Hospital to the journal, SCIENCE (June 3).

Irradiating the stomach lining by X-rays or radium suppresses stomach acidity, but, Dr. Simon points out, the radiation may penetrate to nearby organs. The liver and small intestine, which are more sensitive to radiation than the stomach, may be damaged if large doses of X-rays or radium are directed to the stomach.

To get around this, Dr. Simon decided to try radioactive phosphorus, with atomic weight of 32. The rays from this material are presumably too short to penetrate beyond the stomach wall, since their range in body tissue is about three-tenths of an inch.

As an applicator for trial in dogs, Dr. Simon used a thin rubber bag, inflated it, sprayed it with rubber cement and then applied flocs of short cotton fibers to give it a covering like a smooth coat of felt. A series of dippings into a solution containing radioactive phosphorus was next made. The balloon was then deflated, covered with a rubber sac, inserted into special pouches in the dogs' stomachs, and reinflated to fit the pouches. After two to six hours it was deflated and withdrawn.

The amount of acid in the stomach pouches was markedly reduced. There was no change in weight, blood count or general condition of the animals as a result of the radiation treatment.

If similar techniques are considered for humans, Dr. Simon points out, it is important to note that in one dog there was a return of acidity three months after the treatment and an ulcer was found at autopsy.

Science News Letter, June 11, 1949

PSYCHIATRY-CHEMISTRY

Enzyme Aids Aging Brains

➤ A CHEMICAL rejuvenator for old and aging brains may have been found in an enzyme called cytochrome C.

Elderly men and women whose forgetfulness, confusion, irritability and lack of interest in their surroundings have made it necessary to put them in institutions for mental disease or for the aged have their minds cleared enough so that they can live normal lives outside an institution.

This "distinct improvement" in 11 out of 17 patients treated with the chemical was reported by Drs. Walter O. Klingman and Richard W. Garnett, Jr., of the University of Virginia Hospital at the meeting of the American Psychiatric Association in Montreal.

The chemical that brightens age-fogged brains is extracted from horse and beef hearts. It is given by injection into the patient's veins. The Virginia doctors give it every day for two weeks. Some patients showed "almost dramatic improvement" after three or four doses. Some have retained this improvement for as long as nine months. After the first two weeks of daily treatment, patients are now given a good dose once a week and this promises to keep their minds clear and effective.

Elderly persons who have been neurotic all their lives are not helped by the treatment. The ones who are helped are those who have been normal but whose minds are affected by aging changes, such as hardening of the arteries in the brain.

Trial of the chemical followed earlier reports by other scientists, Drs. Samuel Proger and D. Dekaneas of Tufts Medical College and the Pratt Diagnostic Hospital in Boston. They found that this chemical entirely overcame the effect on mental functioning of oxygen lack in low pressure chambers. Cytochrome C plays a part in the process by which body cells use oxygen for their functioning. Nervous tissue cells, such as brain cells, particularly need oxygen.

The exact way in which cytochrome C helps the elderly patients is not yet entirely understood and the Virginia doctors make no claims for any specific action. They call their research a biochemical experiment. But they "feel encouraged" because the patients "feel so much better and do so much better."

Intelligence tests were given to 10 of the patients before and after treatment. None showed any significant difference in actual scores, but all of them, after treatment, responded faster, were more alert and less confused, were better able to follow instructions and to put ideas into words.

Science News Letter, June 11, 1949

PSYCHIATRY

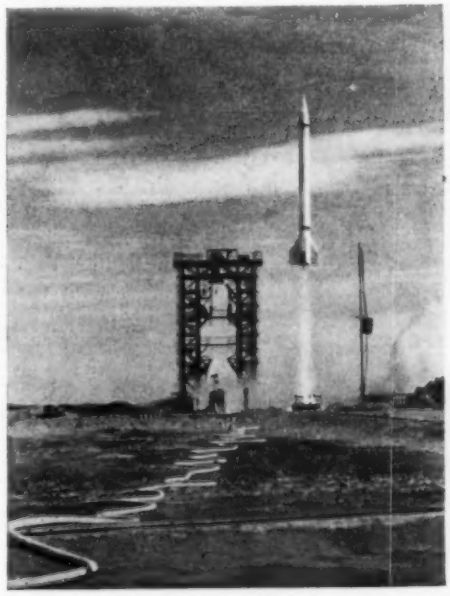
Racial Differences Study Wins Psychiatric Award

➤ A STUDY with far-reaching implications with regard to racial differences and consequent international problems won the $1,500 Lester N. Hofheimer Research award for outstanding accomplishment in the field of psychiatry and mental hygiene.

The award was given to Dr. Benjamin Pasamanik, 34-year-old psychiatrist now in charge of the children's service at Kings County Hospital, Brooklyn, N. Y., at the meeting of the American Psychiatric Association in Montreal.

Dr. Pasamanik's study shows that the lower intelligence quotients scored by American Negroes in comparison with whites is not a matter of racial difference but of difference of environment, especially in the diet of the mothers before the babies are born.

In 1944 and 1945 Dr. Pasamanik studied



VIKING LAUNCHED — ***Recently this first American-designed high-altitude research rocket was launched at the White Sands Proving Grounds, N. M. It reached an altitude of 51.5 miles at a speed of 2,250 miles per hour. The 45-foot Viking was built to replace the German V-2 for upper atmosphere studies. The power plant was developed by Reaction Motors, Inc., of Dover, N. J., and is the most powerful liquid rocket motor yet developed in this country.***

a group of Negro infants and three carefully controlled groups of white infants in New Haven, using the methods developed by Dr. Arnold Gesell at the Yale Clinic of Child Development.

The Negro infants were found to be fully equal to the white infants in all respects, including intelligence. These findings were confirmed by later re-examination.

Significantly, their weight and length at birth and their growth were also precisely similar to white standards. This, Dr. Pasamanik thinks, means that the diet of the Negro mothers before the babies were born may have played a very important role in the development of their babies.

The children in this study were conceived and born during the war years when, probably for the first time, due to improved economic conditions and rationing, Negroes had a diet about equal to that of whites.

Science News Letter, June 11, 1949

Science Service Radio

➤ LISTEN in to a discussion on "Useful Woods of the Tropics" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST, Saturday, June 18. Dean George A. Garratt, of Yale University School of Forestry, and Prof. Frederick F. Wangaard, associate professor of Forest Products at Yale, will be the guests of Watson Davis, director of Science Service. They will tell of the extensive experimentation and testing of woods from jungles and highlands of equatorial regions which have been undertaken by the Yale school of forestry in cooperation with the Office of Naval Research.

Science News Letter, June 11, 1949

Words in Science—RH

➤ A BLOOD factor, important because it may cause the illness or death of a baby through incompatibility of the baby's blood with that of its own mother, is called Rh because it was first found in the blood of a Rhesus monkey. You pronounce the letters separately—R-h.

When a person lacks the Rh factor, any mingling of his blood with Rh positive blood sets up a process like immunization against disease. This reaction serves to destroy the Rh positive blood just as the blood of an immunized person checks the invading germs of a disease.

If a woman having Rh negative blood should receive a transfusion of Rh positive blood, it would set up this immunization. Then, if, after that, she should have a baby with Rh positive blood, the baby would be killed or made very ill by its own mother's blood.

Science News Letter, June 11, 1949

GENETICS

Extra Chromosomes in Mouse Ova Developed

➤ EARLY-STAGE embryos of mice, with cells containing three times the basic number of chromosomes, have been obtained in experiments conducted by Drs. R. A. Beatty and M. Fischberg in the laboratories of the Animal Breeding and Genetics Research Organization in Edinburgh. Results are announced in the British science journal, NATURE (May 21).

Plants and lower animals with doubled-up chromosome counts are fairly common in nature, and can also be produced artificially by treatment with chemicals, X-rays, temperature shock, etc. Mammals exhibiting this phenomenon, however, have never been reported.

Some time ago the American zoologist, Dr. Gregory Pincus, was able to get extra-chromosome eggs from rabbits to divide twice. Drs. Beatty and Fischberg, however, succeeded in getting their mouse eggs to continue dividing as far as the stage called the blastula, which consists of several hundred cells.

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Question Box

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Photographs: Cover, Dr. R. Bowling Barnes, Dr. Charles J. Burton; p. 371, Glenn L. Martin Co.; p. 373, General Electric Co.; p. 375, C. A. Schroeder; p. 378, U. S. Bureau of Biological Survey; p. 379, U. S. Fish and Wildlife Service.

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ANTHROPOLOGY-ARCHAEOLOGY

World's First Murderers?

Man-apes, if they were human, may have been the world's first murderers. Caves containing remains of killed animals and crushed man-ape skulls were found.

➤ WERE the world's first hunters also the first murderers?

The long-extinct walking man-apes of South Africa may have used bone clubs to kill other animals for their food, and perhaps also to crack each others' skulls. Evidence tending to show this is presented by Dr. Raymond A. Dart of Johannesburg, South Africa, in the AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY.

Dr. Dart and his colleague in research, Dr. Robert Broom, have long insisted that the man-apes must have walked erect, and because of this and their teeth, they should be placed on the side of man rather than the side of the apes. The scientists have been vindicated in the last two years by finding pelvic bones of two man-ape types, Plesianthropus and Australopithecus, which could only have belonged to upright animals like man.

Artifacts of culture, however, present a more difficult problem. Up to now, anthropologists have been barely willing to concede that the more advanced Java man, Pithecanthropus, probably had recognizable tools of stone. Nonetheless, Dr. Dart is satisfied that the Australopithecus who lived in the caves at Makapansgat did indeed use clubs of bone. This extension of "archaeology" to include the life habits of a creature still half an ape will give Dr. Dart's colleagues something to wrestle with.

Recognizing that his case called for a corpus delicti, Dr. Dart decided to make a systematic examination of the remains of various kinds of baboons found in all the caves used by the man-apes, at Makapansgat, Sterkfontein and Taungs. He sought the advice of Dr. R. H. Mackintosh, professor of forensic medicine at the University of the Witwatersrand, who has wide knowledge of skull wounds caused by lethal weapons, and with injuries to the skull and skeleton involved in other causes of death. Of some 58 baboon skulls and jaws, almost all gave evidence of breakage by heavy blows. Many were on the left side, indicating that the blow was delivered by a right-handed animal.

Some of the fractures showed peculiar paired depressions such as would fit the twin ridges found on the lower end of large leg bones of herbivorous animals, a number of which were discovered in the caves. Finally, some of the skulls indicated that pieces had been peeled or broken out of the top by hand or by a bone point in order to allow the brain to be taken out for eating.

Dr. Dart finds that these many wounds were not due to the paws and teeth of carnivores, which might be suggested as a cause. Nor were they due to crushing by weight of rock during the time the bones lay fossilized in the cave material, for they gave clear evidence of having been made while the bone was fresh and before it had become fossilized.

Dr. Dart even finds evidence that the skulls of the several man-apes themselves were broken by the same kind of violence. If the man-apes were human, and if they killed one another with clubs, it was murder—or something very like it.

Science News Letter, June 11, 1949

AERONAUTICS

Foresee Higher Speed with New Engines in Stratojet

➤ NEW and more powerful jet engines are to be installed experimentally in a Boeing XB-47 Stratojet. These engines will give an increased thrust of 25% to the plane that has already achieved a transcontinental record at an average speed of 607 miles an hour.

The new engines are General Electric J-47 turbojets. Each will develop more than 5,000 pounds thrust, compared with 4,000 pounds thrust of the earlier J-35 turbojets. The new engine is described as an extended development of the J-35, and has approximately the same general dimensions and shape. The Stratojet is equipped with six jet engines. The new installation will give the Stratojet a total power potential of more than 48,000 pounds of thrust, when using its six J-47 turbojets and its 18 integral aerojet jato rocket-assist units.

Science News Letter, June 11, 1949

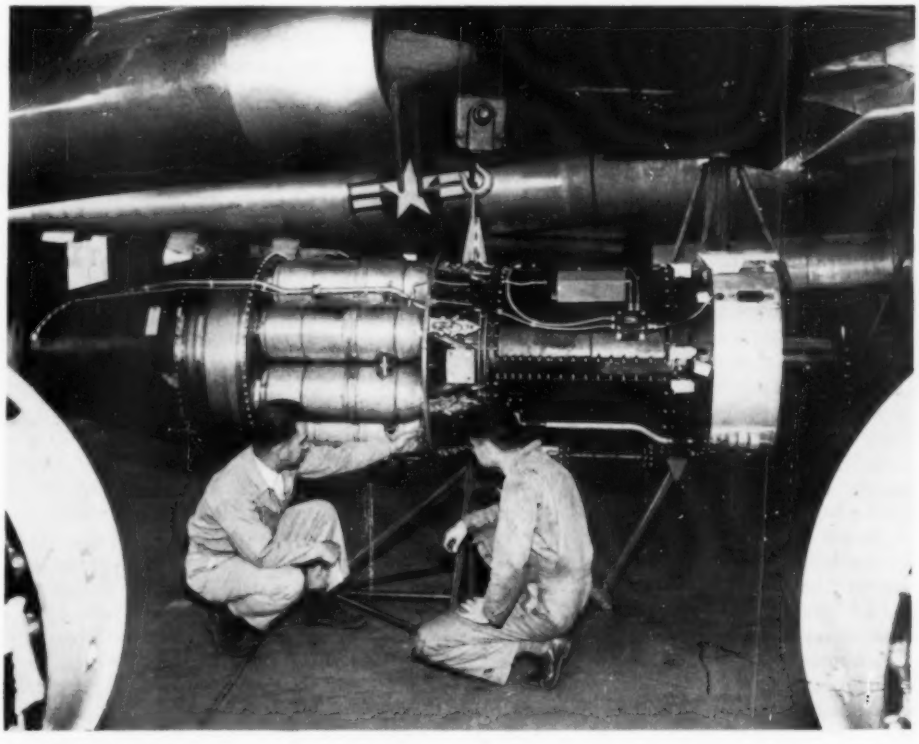
AGRICULTURE

Larger Tomato Yields Promised by New Method

➤ A NEW method for producing seed for superior tomatoes at low cost is reported by Drs. R. E. Larson and Li Peng-fi of Pennsylvania State College in the journal, SCIENCE (June 3).

The larger the seed, the more tomatoes per acre will be produced by plants from that seed, their experiments show. By selecting seeds according to their size, breeders of pure line tomato strains will get more vigorous plants and will be saved the cost of growing considerable undesirable material.

Science News Letter, June 11, 1949



MORE POWER—Six of these J-47 aircraft jet engines will replace the less powerful J-35's in one of the two experimental XB-47 Stratojets, the world's fastest bombers, and will power production models.

SOCIOLOGY-BIOLOGY

The Menace of Radiation

A most important question for the future of human beings on earth is asked by a great biologist: Is radiation a menace to posterity?

By DR. H. J. MULLER

The effect of the increasing use of radioactivity upon our human germ plasm and heredity was discussed in a recent Science Service radio talk by the discoverer of radiation-induced mutations. Dr. Muller, who is a Nobelist, and professor of zoology at Indiana University, expands in this article this important contribution.

➤ NO MAN, worthy of being a man, lives for himself alone, or for today only. We are aware, as never before, that we are the heirs of hundreds of millions of years of biological evolution, that our culture is built of thousands of years of accumulated civilization, and that we ourselves are but fleeting guardians of all this precious heritage. We know that important changes are still taking place in it, even as it lies in our own custody, and in fact are accelerating. And so we want to know what kind of world we are making for the future.

Use of the Atom

In our age the greatest advance in our physical powers has been that derived from understanding and control over the inner constitution of the atom, and over the radiations which it gives forth. What are likely to be the consequences of our use of these techniques? We know that, if they are employed for our benefit, they will immeasurably enrich human life, and open up vast new domains. Let us also recognize that a war in our generation, if conducted by both sides of the conflict with atomic weapons, could, depending on its magnitude, throw back civilization for generations. Conceivably, by the widespread scattering of radioactive material, it might even wipe out mankind in one sweep. But let others deal with these questions. Let us ask here about the genetic effects, that is, the effects on that most invaluable of all materials that have been entrusted to our care: the biological basis of our heredity, the living substance which we will hand down, if we survive at all, to all generations following us, out of which they will have to make their lives.

A number of persons who are not professional geneticists have expressed themselves about this matter. One school has claimed that there is likely to be a great increase in the number of freaks of all kinds and that many living horrors, but possibly also supermen, will be produced. Perhaps, they say, if mankind is not destroyed in our generation, the accumulated damage to his heredity caused by an atomic war may result in his dying out at some future time, or perhaps it may cause his speedier biological evolution. Another school, in denying all this, has claimed that there will be no significant hereditary damage, either from atomic warfare or from other applications of radiation. They say that hereditary changes, the mutations, if produced at all, will be negligible, and that we need not concern ourselves about them.

Both schools are wrong, and fail to understand the known principles concerning mutations. They imagine that most mutations give rise to visible monstrosities, and that these would be evident within a few generations following the change in the hereditary material. Moreover, both sides misunderstand how mutations of natural origin, which would occur anyway, work themselves in so as to obscure the picture of what the radiation has done.

As I have insisted on numerous occasions, as far back as 1940, the exposure of people's reproductive organs in any one generation to the largest doses of radiation which would allow reproduction at all would probably give rise to no important increase in the number of human monsters appearing in any succeeding generation. This would be true even if the whole population had been exposed in this way. And there would be little if any measurable decline of any human attributes. For the effects would be spread too thin, over thousands of years, to constitute anything readily appreciated at any one time. They could not, in themselves alone, be any source of danger to civilization.

On the other hand, this is very far from saying that the ultimate hereditary damage would be negligible, if we are Western enough to consider that individual men are important. The effects of radiation on heredity are more insidious, elusive and delayed than any other biological effects known. Their total magnitude would undoubtedly be very considerable. They would be comparable, in their summation, with the damage to the original generation that was directly exposed.

To believe that the particles of heredity, the *"genes"*, as we call them, have as their main function the control of such visible traits as hair form, eye color and other conspicuous features is to grossly underestimate their role. The gene determine our entire bodily constitution, including our marvelously intricate system of chemical substances and physiological activities. Mutations are permanent changes in these genes. They result, mainly, in inner physiological alterations, which we can seldom directly see the effects of. Being blind changes, happening at random, they are harmful in the vast majority of cases. Some of them cause death, even before birth. But the effects of the majority are not so drastic, and are often very difficult to recognize, even though they may secretly handicap us. Usually the effect is exceedingly slight if we have received a harmful gene from only one parent. For the corresponding normal gene from our other parent largely protects us. Yet even the slight effects of a harmful gene from one parent are seldom negligible, in the long run.

Hereditary Weaknesses

Nearly all of us, if a detailed study were to be made, would be found to suffer from the effects of a number of mutated genes, whether from one or both parents. These mutations arose in past generations as accidents of nature. At least one germ cell in twenty, if we may judge by fruit fly studies, carries a newly arisen natural mutation, besides many derived from earlier generations. So, even under relatively good conditions, most individuals bear the brunt of one or more of these hereditary weaknesses, that usually become more expressed as we grow older. For instance, one person may require more vitamin B_1 to keep fit, another may be unduly subject to hayfever, rheumatism or cancer, this one is nearsighted, and that one is by his natural idiosyncrasy unusually nervous, or tends to be anemic or to have high blood pressure. To say that these deviations are negligible and that doubling their frequency in the population would do no harm is simply irresponsible.

In natural populations, these ailments do not multiply beyond a certain frequency, even though new ones are always arising by fresh natural mutations. The only reason they do not accumulate more and more, and so drag us down to the lowest depths of biological degradation, is because the most afflicted individuals tend to die out, or not to reproduce. Such an event is what we call a "genetic death". In the long run, as many mutations derived from the past must die out in each generation as there are new mutations arising. This figure, as we have said, is likely to be about one in twenty. On the average, each harmful mutant gene, no matter how slight its usual effect, must cause the genetic death of some descendant in the end. Yet a given ailment may handicap a long succession of individuals, usually scattered sparsely through hundreds or even many thousands of years, before it does make its kill. These

(Turn to page 379)

MEDICINE

Drug May Aid Arthritics

Aureomycin may replace gold salts in the treatment of rheumatoid arthritis if it proves as effective on humans as it has in animal experiments.

➤ A DRUG that has the color of gold may come to replace the precious metal itself in treatment of a widespread human disease, rheumatoid arthritis.

Animal experiments suggesting this were reported by Dr. William C. Kuzell of Stanford University at the International Congress on Rheumatic Diseases in New York.

The golden yellow drug that proved as good as gold in treating arthritis in rats is the famous antibiotic, aureomycin. Rats and mice get a joint disease similar to human rheumatism when they are infected with germs known as pleuro-pneumonia-like organisms. This polyarthritis may be prevented or cured by gold salts which have been used with some degree of success in the rheumatoid arthritis of man.

Gold salts, however, are potentially poisonous. This has limited their usefulness in treating human arthritics. So Dr. Kuzell and associates, Grace M. Gardner, DeLorez M. Fairley and Helen B. Tripi, searched for a drug that would be as efficacious as gold salts and safer.

"The only compound tested which gave results equal to those with gold salts was aureomycin," Dr. Kuzell declared.

When given either by injection, by stomach tube or mixed with food, aureomycin prevented the development of any arthritis in the rats. In animals where the arthritis was allowed to develop aureomycin effected a cure within 48 hours.

Penicillin, first of the antibiotic drugs discovered, made the infection in the rats worse. Chloromycetin and citrinin, two other antibiotics, did not alter it. Streptomycin showed some beneficial effect but of an order much less than that of gold or aureomycin.

Whether aureomycin will help humans with arthritis is not yet known. But since it is a safe drug to give and since the new and promising Kendall's compound E is not yet available for trial, it seems likely that aureomycin will soon be tried.

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BOTANY

Carob for Stock-Feeding

➤ LIVESTOCK on ranches in the dry Southwest may one of these days be munching a feedstuff mentioned in the Bible: "the husks that the swine did eat," of the Parable of the Prodigal Son. Actually, a more accurate translation would have been "pods," for the tree is a member of the legume or bean family, and its nutritious though tough fruits look like dried lima-bean pods that have turned to deep, rich brown.

In the Mediterranean lands, where it has been grown for centuries, the tree is known as "carob." Carob pods are rich in sugar, with a taste suggesting coarse dates. If the out-of-luck Prodigal Son "was fain to fill his belly" with them, as the King James version puts it, he might have found them monotonous after a while, but he wouldn't have starved.

Carob trees do well in dry climates, and they will live and bear crops with no fertilization and only chancy water supplies, but they thrive better and are more profitable if they are treated more kindly and given their share of irrigation water. They require a fairly warm climate—about equivalent to that required for citrus-fruit culture, though they will stand a little more cold.

A consistent campaign to obtain wider planting, for stock-feeding purposes, has been undertaken by a San Diego physician, Dr. Walter Rittenhouse. At his suggestion Dr. J. Eliot Coit, an agricultural botanist at the University of California at Los Angeles, has written a pamphlet giving all essential facts about the tree and its culture. Dr. Rittenhouse is distributing this publication. He states that he was stimulated to start his campaign by a suggestion in a Nature Ramblings column, a feature in the SCIENCE NEWS LETTER, which advocated substituting permanent tree plantings for erosion-encouraging rowcrops, where practicable.

An important recent development has been the discovery that carob can be grafted on the roots of a related native American shrub or small tree, the mesquite, common in the Southwest. This was reported to Dr. Rittenhouse by Lloyd H. Moss of Santa Barbara. The two species are so nearly similar in appearance that an early Spanish missionary in the Mexican state of Sonora, listing the plants he found there, set down mesquite as "gueriba," or carob.

Science News Letter, June 11, 1949

NEW USE FOR BIBLICAL CAROB—This fine, bushy-topped seedling carob serves as a shade tree on an avenue in West Los Angeles.

Beeswax has been called a natural plastic, and probably one of the first plastics used by man.

The federal government's income from its *cigarette tax* of seven cents a package yielded about $1,200,000,000 in 1948.

PSYCHOLOGY-MEDICINE

Psychogenic Rheumatism Comes in Two Varieties

➤ MANY a patient with symptoms of rheumatism has a disease which originates in the mind. But many another has organic arthritis, with definite changes in body tissues, which has been precipitated by mental and emotional factors.

The differences between these two kinds of psychogenic rheumatism, as doctors term it, were explained by Dr. Edward Boland of Los Angeles and Dr. Edward Weiss of Philadelphia when they appeared as guests of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia Broadcasting System.

Dr. Boland first used the name psychogenic rheumatism to describe these particular forms of the disease. Among 450 consecutive cases diagnosed as arthritis which he and an associate examined at an Army General Hospital during the war, he found that about one-third were incapacitated because of psychogenic causes.

One kind of psychogenic rheumatism, he said, "is an ache or pain, or perhaps a chronic fatigue, which is not traceable to actual organic causes but which does have its origins in the mind. Its symptoms are very often quite similar to those of arthritis or rheumatism of organic origin, but it is not an organic disease. The other form of psychogenic rheumatism is actually organic, it really is rheumatic in nature, but it is brought on by some emotional disturbance."

"Smoldering resentment," of which the patient may be entirely unaware, is usually the kind of emotional disturbance involved in psychogenic rheumatism, Dr. Weiss stated.

"When a child resents but also loves a parent, or when a wife feels love but also resentment toward her husband, there exists tension which often cannot be expressed by word or deed," he explained. "Sometimes, the body expresses the situation by developing symptoms of arthritis where no organic cause is present; and sometimes, as Dr. Boland pointed out, the symptoms of arthritis which have existed but have been latent may be brought on."

Science News Letter, June 11, 1949

PSYCHOLOGY

Normal Happy Persons Will Get Scientific Study

➤ NEW research aimed at finding out about normal, happy and successful persons —not the psychologically maladjusted who have gotten so much attention from scientists—is being made under grants announced by the Rockefeller Foundation.

Pres. Chester I. Barnard of the Foundation points out that it's the "normal happy persons whose personalities hold the key to successful living."

Thus, the foundation has made a grant to Prof. Henry A. Murray, Jr., of Harvard University, for the study of the personality development of "strikingly happy and successful persons." Another study will be made of "normal" Harvard undergraduates by Dr. Arlie V. Bock, on a Rockefeller Foundation grant.

Physicians, anthropologists, psychologists and other scientists are participating in a program of research on the growth and development of children at the Child Research Council of Denver, also under a grant from the Foundation. This work of Dr. Alfred H. Washburn and associates will be aimed at discovering what is normal for each child, by studying him from infancy to adulthood.

Science News Letter, June 11, 1949

GENERAL SCIENCE

Laymen Understand Science Better from New Gains

➤ WILL YOU, if you're not a scientist, understand science better if you study the seventeenth-century development of the air pump than if you plunge right into the recent, twentieth-century discovery of the man-made atom-bomb element, plutonium?

Plutonium is your best bet, contends a scientist who has been teaching university chemistry for four decades. This "psychological" approach to understanding the scientific method was proposed by Dr. Joel H. Hildebrand, University of California chemistry professor. Dr. Hildebrand presented the 1949 Remsen Memorial Lecture in Remsen Hall at Johns Hopkins University in Baltimore.

The California chemist disputed the idea of Harvard President James B. Conant who believes the work done on the air pump in the 1600's is an effective subject for giving the layman an insight into the techniques of science.

This "historical approach" goes against educational psychology, Dr. Hildebrand feels. You are more likely to be interested in the immediate problems of nuclear energy, he argues, than in the historical scientific problems of the past.

The chemistry professor criticized the "survey" or "integrated" science courses now offered by some universities and colleges for the non-science student. Also faulty, he believes, is the idea of giving one introductory science course for the pre-science student and another for the non-scientist.

"There is a profound difference between knowing some elementary facts about a variety of sciences and knowing what science itself is about," Dr. Hildebrand cautioned.

Learning "what science is about" cannot be done entirely in the lecture room, he added.

"Athletes, even amateurs, are developed on the field, not on the bleachers," the speaker pointed out.

Science News Letter, June 11, 1949

IN SCIENC

MEDICINE

Find Rheumatics Are Right They Can Predict Weather

➤ RHEUMATISM sufferers who claim they can predict changes in the weather are right. Why was explained in a report by Dr. Jonas H. Kellgren of Manchester, England, to the 7th International Congress on Rheumatic Diseases in New York.

It appears that in some forms of arthritis pain increases when the temperature starts dropping as is the case preceding bad weather.

This is based on his discovery that there are two distinct kinds of pain. Experiments in which certain nerves were blocked off from sensation revealed that the body's sensitivity to deep pain and surface pain could be distinguished. It is the deep pain which responds to the rapid cooling.

Dr. Kellgren pointed out that pain and its origin is basic to the study of many types of rheumatic diseases and their diagnosis. Doctors recognize at present that pain appearing in an arm or leg may really stem from pressure on a nerve which has its origin in the spinal column where a vertebra may be affected. It has also been found that there are "trigger points" of pain which will radiate to distant parts of the body under pressure.

Science News Letter, June 11, 1949

MEDICINE

Diabetes Is Prevented With Diet Alone

➤ SUCCESS in preventing diabetes by treatment with diet alone was announced by Dr. Bernard A. Watson of the Clifton Springs Sanitarium and Clinic to the American Diabetes Association in Atlantic City.

He said that in 80% of the cases patients can be returned to a normal state of sugar utilization by sticking to a prescribed diet.

The treated patients came from a group of approximately 603 who had sugar in their urine. Fifteen percent of these showed an abnormal amount of sugar excretion when given the standard sugar tolerance test for diabetes. After a follow-up period of two to five years those whose condition became worse were put on the diet.

The diet made it possible to reverse this process back to normal even in the early clinical stages of the disease, Dr. Watson stated. However, even though the disease can be prevented when caught early, it cannot be cured, he pointed out. If the patient eats immoderately the condition will return.

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NCE FIELDS

MEDICINE

Joint Fluid Reveals Kind of Disability

➤ THE fluid that cushions the joints of your body is also proving a good diagnostic tool for the doctor, Dr. Marian W. Ropes of Massachusetts General Hospital, Boston, told the 7th International Congress on Rheumatic Diseases meeting in New York.

Slight cell changes occur in this fluid when the joint swelling is caused by an injury. If the swelling is induced by rheumatoid arthritis or infectious arthritis, major changes occur, such as clotting of cells and increase in their number, Dr. Ropes said.

For diagnosis, the doctor sticks a needle into the joint area and draws some of the fluid into a syringe. Laboratory tests are then made on the fluid. An injured joint will yield on an average 1,000 of these distinctive cells. The cells count may go up to 14,000 for rheumatoid arthritis and up to 65,400 for infectious arthritis.

Science News Letter, June 11, 1949

AGRICULTURE

Cotton's Lead Challenged By Synthetic Fibers

➤ COTTON is still America's number one textile fiber, used more than all others combined, but other American natural fibers and man-made fibers are forging ahead and gradually decreasing the cotton lead.

Cotton supplied 57.4% of the nation's needs in 1948, compared to 58.4% in 1947 and 60.6% in a five-year period preceding the war. These are figures just released by the U. S. Department of Agriculture. Rayon held second place, 14.9% of the total, with wool, jute, sisal and Manila hemp, flax, and synthetic fibers other than rayon supplying most of the rest. Wool is widely used in many textiles, but this animal fiber makes up only 10% of the total fiber consumed in the United States.

Rayon consumption in 1948 reached an all-time high of 1,017,000,000 pounds. Flax is a minor fiber in American production, the total used being only 0.2% of the total fiber consumption. Synthetic fibers other than rayon are beating even the rayon increases; 70,700,000 pounds were consumed in 1948. These include nylon, glass fiber, casein fiber, zein fiber and synthetic resin fibers.

Until about 1935, rayon was the only synthetic fiber produced commercially in the United States. It was made from cellulose. Glass fiber is the oldest non-cellulosic synthetic fiber. Its output, commercially, began about 1936. About two years later production of Vinyon, made of Vinylite synthetic resin, was started. Commercial production of nylon, most important of the synthetic fibers, began in 1939, following a short period of pilot-plant operation.

Considerable research is under way to develop additional synthetic fibers, particularly from vegetable proteins and synthetic resins. Included is work on peanut and soybean protein fibers, already developed but not yet produced commercially in America. Process for the production of fibers from cottonseed protein and from the metal salts of carboxymethylated cellulose are under study at the department's Southern Regional Research Laboratory.

Science News Letter, June 11, 1949

AERONAUTICS

Twin-Rotor Helicoper Is Safe and Easy To Control

➤ BEAUTY is not a feature of the new Kaman twin-rotor helicopter making frequent test flights at Windsor Locks, Conn., where constructed, but it is an aircraft easy to maneuver, easy to control, able to carry a good pay load, and it has high factors of safety.

The familiar helicopter in the American sky has but one set of rotating blades, the mechanism that lifts the aircraft from the earth and keeps it in the air and, when tilted from the horizontal position, gives it forward, backward or sidewise movement. There are several types that utilize two sets of rotating blades, positioned either side by side or in tandem. The British are building a 24-passenger helicopter with three rotors. The unique features of the Kaman craft, with two sets of rotating blades side by side, are their simplicity and their control.

The design of the craft simplifies the rotor hub and blade construction, and substantially reduces the factors of weight, cost and maintenance. Another feature is what the makers call a servo flap control which promotes ease of handling in hovering, flight in all directions, extreme maneuvers and auto-rotation.

This helicopter, although capable of carrying two passengers and the pilot, or a pay load of 800 pounds, is designed for utility purposes in agriculture and the industries such as insecticide spraying, aerial surveying, pipeline and electric powerline inspection, and similar jobs. It has a 190-horsepower Lycoming engine, an empty weight of 1,700 pounds, a cruising speed of 70 miles an hour and a range of 235 miles. Its intermeshing rotors have a blade clearance of 8.5 feet. Rotating in opposite directions, they eliminate torque, or the tendency of single-rotor helicopters to spin in the air.

Science News Letter, June 11, 1949

GENERAL SCIENCE

Science Clubs Working for Future Scientific Gains

➤ WORLD'S largest science organization is not made up of today's scientists but tomorrow's.

The organization, Science Clubs of America, boasts 250,000 members—all boys and girls interested in science. Watson Davis, director of Science Service which administers Science Clubs of America, described the work of the Science Clubs at a convocation at Denison University in Granville, O.

These quarter-million boys and girls are members of more than 10,000 clubs, affiliated with the national organization. Most of them are junior and senior high school students.

"Experience shows that many of our leading scientists of today were within these years of their lives when they first had aroused their research enthusiasm and curiosity," Mr. Davis pointed out.

"Ten years of age is not too young to get a future scientist started, and if he has the opportunity of science experience, he will be largely self-starting," the director of Science Service declared.

Science News Letter, June 11, 1949

VETERINARY MEDICINE

Eskimos Get Trichinosis From Eating Walrus Meat

➤ TRICHINOSIS, which people in temperate and tropical climates get mainly through eating undercooked diseased pork, has been detected in several cases among the Eskimos of Greenland. They apparently picked up the parasites by eating walrus meat.

A report of a study of these cases is presented by Dr. Hans Roth of the Royal Veterinary and Agricultural College, Copenhagen, in the British science journal, NATURE (May 21).

The cases had at first been diagnosed as paratyphoid. It is now considered probable that other baffling sicknesses in Greenland, diagnosed as typhoid and "meat poisoning", were really trichinosis.

Dr. Roth had samples of the flesh of a number of Arctic animal species collected and sent to him for examination. Wild animals infected with trichinae were found to be polar bear, arctic fox and bearded seal.

Much more serious, however, is the case of the Eskimos' sledge dogs. Out of 66 samples of dogs' flesh examined, 46, or 70%, were found to contain trichinae. Disabling of dogs, the Eskimos' only draft animals, threatens as serious consequences to the people's life as sickness among the population itself, Dr. Roth points out.

Science News Letter, June 11, 1949

ZOOLOGY-CHEMISTRY

Blockade Works Against Rats

Sealing every opening in walls and foundation will deprive rats of food and shelter. Red squill is the best poison for getting rid of the rats already present.

By DR. FRANK THONE

➤ MAN'S endless war of defense against rats is not an affair of seasons, like his wars against insects and weeds. Rats are with us the year round, stealing and spoiling food, gnawing holes in walls and causing fires, menacing us with half-a-score or more of dangerous and loathsome diseases.

Nevertheless, spring and early summer are good times to review our situation in this war, to re-assess the values of weapons and tactics we have been using, to press vigorously where we are succeeding and to improve our attack where we are not. Even the annual rite of cleaning up the house and yard brings a reward beyond the satisfied feeling of having things neatly in order again. Ridding the place of rubbish means that you have deprived rats, as well as other vermin, of lurking and breeding places. Imposing stricter sanitary discipline on that perennial problem, the garbage can, deprives not only rats but their companions in evil, flies, of a favorite source of food.

Blockade is frequently the most effective weapon when man wars against man. It certainly is the best weapon in man's war against the rat. Poisons, traps, terriers, cats and guns are all very well in their way, but none of these will avail much until we stop providing food and shelter to the very enemy we are fighting.

Close Every Opening

First move should be to close every opening in walls and foundations through which rats can get in from the outside. Plumbers and electricians sometimes make bigger holes than are necessary to admit their pipes and conduits. These should be found and securely stopped, with either masonry or metal. Wood won't do: rodent teeth make short work of such patches. Then similar precautions should be taken with internal partitions, to hamper the movements of any rats that do manage to break in, and to guide them to where you will presently put your traps and pioson baits. Keep all foods in tooth-proof containers, of metal, pottery or glass.

Having made your house and its contents as rat-tight as possible, carry your blockade warfare outdoors as well. If you really must keep a stack of old lumber or similar potential rat housing, set it on stilts at least 18 inches high. Rats won't nest under it, and are unlikely to want to stay in it either—too exposed. A similar stand for the garbage cans is a good idea, too—and then keep them tightly closed, and well hosed down on the outside.

If you feed dogs, cats or other pets outdoors, don't leave bones or scraps from their meals lying about after they have eaten. Rats aren't too proud to take a dog's leavings, any more than your own. Clean up after your pets and put their scraps into the garbage can, too. And remember this, next winter: when you feed the birds, don't scatter grain on the ground, for you'll be feeding nocturnal rats as well. Put up feeding trays, on rat-high stands or shelves.

Once you have your fixed defenses as tight as you can make them, you can begin thinking of means for geeting rid of enemies already within your gates, or those that may manage to slip through in spite of your blockade. Poisons and traps are the usual weapons.

This season sees a return to favor of the prewar favorite, red squill, as the best rat poison for the average householder to use. ANTU, the wartime synthetic that had dramatic initial success, is less used now; indeed, its largest producer last year has now given it up entirely, though other firms are still manufacturing it.

Reason is simple enough: the rats "got wise." ANTU is just as poisonous to the common brown rat as it ever was—but in places where it was used without completely wiping out the rat population, the survivors recognize it and refuse to touch even the most tempting baits containing it. Your enemy is cunning and last year's heavy losses have taught him caution.

Fortunately, the decline in ANTU's success has been offset by the return to market of better quality red squill than has been available since the war cut off its supply sources in the Mediterranean basin. And although this dried bulb has been used for many years in combating rats they have never learned to recognize or avoid it. So red squill is your number one poison weapon again.

1080 Deadly

The other rat-killing chemical evolved during wartime, known by the convenience-number 1080, is still being used, but only by professional pest control operators. It is so deadly to all higher animals, as well as to human beings, that there is an absolute ban on selling it in the open market. Even some of the professionals are afraid of it—as well they may be.

Pest control operators, or "exterminators" as they are often called, hesitate especially to use 1080 in dwellings or elsewhere if there is a chance for small children to get hold of it. Children of the inquisitive-exploratory age automatically put into their mouths everything they can get into them—rat-baits included. Consequences would not be merely serious, they would be fatal. It takes very little 1080 to kill, and there is no known antidote. Hence the extreme

A LIVING MENACE—You should never leave a full garbage can in a spillable position where rats can feed on the contents.

POISON WITH SAFETY—U. S. government rat-killers advocate putting poisons, especially the deadly 1080, inside feeding boxes like this one where rats can reach them but pets and children cannot.

caution observed in its use, effective against rats though it is.

One safeguard has been added this year. The same chemical firm that reluctantly accepted the unwelcome monopoly of making 1080 now provides operators with a black dye to discolor the water baits in which this poison, itself colorless and odorless, is set out for thirsty rats. Use of this dye is not legally required but it is strongly recommended, and most pest control operators have begun using it.

One procedure that is recommended to householder and professional alike is the use of bait-boxes. These are tightly lidded boxes, with entrances and exits through which rats can move freely, and within which the baits are placed. Thus rats can reach them, and pets and children cannot. If there are small children about, it might be a good idea to equip each box with a hasp and inexpensive padlock, just to make sure.

Pre-baiting is also recommended practice. This means placing unpoisoned baits or little paper cups of water where the rats can find them, for several nights. Then, when the beasts have got used to expecting you to play Uncle Sucker for them, you switch roles and play Aunty Borgia instead. Usually, one or two nights of poisoned baits after one of these pre-baiting campaigns will clean up the premises.

Of the several types of rat traps that have been used at one time and another, probably the favorite nowadays is the snap-trap, that whacks down on the animal's neck or back, breaking the spine and killing almost instantly. Like all traps strong enough to be effective, it must be treated with considerable caution, for it is easily able to break the bones in a child's hand, or inflict painful injury on even an adult finger incautiously poked into it. So a trap of this kind should be set with care, and placed where a rat, and a rat only, is likely to spring it.

As commonly manufactured, this type of trap has a trigger much too small for best effect. It almost requires suicidal intent on the part of the rat to get caught. The value of the trap can be greatly increased by simply tacking or gluing a piece of stiff cardboard to the top of the trigger. It should be a size that will just permit the trap to clear it when it snaps.

You can be surer of getting your rat if you will place the trap, not directly in front of a rat hole, but a little to one side, close to the wall, and lean a short piece of board so as to form a kind of tunnel with the rat hole at one end and the trap at the other. A rat likes a sheltered run of this kind, and will readily scurry into it after preliminary cautious look-around before coming out of its hole. It is a good idea to use the pre-baiting approach too, setting up the improvised runway a couple of nights before you place your trap.

In general, whether you attack with poison or traps or both, study your rats as you would study any enemy in combat. Look for signs of their presence and movements, try them with various baits placed in different spots. Every piece of information you can get will prove of value in the defense of your household against its stealthiest and most dangerous enemy.

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The Menace of Radiation

From page 374

are the most delayed-action biological time-bombs known.

There is no way to reduce substantially, below the natural level, the number of mutations, and of genetic deaths caused by them. But their number is considerably increased by artificial application of energetic radiation, such as alpha, beta, gamma or X rays. All forms of life are affected in this way, but the higher forms on the whole are affected more. There is no practicable means of reducing this mutational effect, if the radiation is allowed to reach the germ cells. Nor can a mutation, once arisen, be undone by our design. It is also well established, despite some objections by non-geneticists, that the frequency of the mutations induced in the genes is exactly proportional to the total dose of radiation, no matter in how concentrated or dilute a form the dose was received. Thus there is no dose without at least some slight risk, commensurate with its size.

The exact risk of mutation for a given dose is by no means known for a man, however, nor even for any backboned animal, important though this matter is. It cannot be discovered by observations on people at Hiroshima, nor on goats from Bikini. We may anticipate with high probability no detectable effects in their descendants, even though, as before explained, these effects, spread thinly over thousands of years, will probably be considerable in their totality. Only most meticulous grand-scale experiments, conducted painstakingly over many years with laboratory animals like mice, bred in precisely controlled ways, can give a good indication of just what quantities of mutations of different types have been produced. Meanwhile, we must rest our case on the very definite results from lower forms, such as flies, moths, molds, and bacteria. To be sure, these results are already supplemented by some fragmentary data from mammals—mice—which do prove that higher types are no exception so far as the principle is concerned, and that the general magnitude of the effect in them is similar.

In flies, a dose of about 150 roentgen units results in a frequency of induced mutations about equal to the frequency of those that

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arise naturally per generation, that is, about one among twenty germ cells, but occurring in addition to the natural ones. This means that one in twenty offspring of the exposed parents, while seldom appreciably affected themselves, would hand down a hidden change that had been induced. Somewhere in the succession of future generations this would cause a genetic death, and usually, before doing so, it would handicap several individuals. Thus, among all the descendants of 20,000 parents so exposed, about 1,000 eventually would in the end be killed genetically, and along the way several thousand, though not killed, would have been more or less handicapped. Mostly, the mutations would express themselves as indefinite debilities which, mixed with the similar debilities naturally occurring in the population, could not be singled out individually as due to the radiation. And, unless special breeding methods were used, they would be scattered over too many generations to affect the population of any one generation measurably in a statistical way. And yet, if these individuals had been human beings, could we say that the killing and hampering of these several thousand people had been negligible?

Average Radiation Dose

Now, it can be estimated that this dose of 150 roentgens is the average dose to which not 20,000 but several hundred thousand people would probably be exposed if one bomb like that at Hiroshima were dropped on a metropolitan area. You yourselves can calculate from this the probable future effect. Moreover, this dose is only about half of that which some physicians have made a practice of applying to the ovary, to facilitate release of the egg in those desiring pregnancy, and thousands of babies in this country have been started on life with this treatment. It is about a third to a quarter the dose sometimes given purposely by physicians to the reproductive organs of people who wish to be made temporarily—but only temporarily—infertile. It is about twice the dose which is commonly received by the *skin* in the course of one five-minute fluoroscopic examination of internal organs, although of course much less than this amount usually reaches the reproductive organs on one such occasion. It is just the dose which would be received in five years by people getting, day after day, the dose of one tenth of a roentgen per day which has till recently been accepted as the so-called "tolerance dose", and it is what they would get in ten years with the new "permissible dose". It is probable that many X-ray operators, patients, industrial workers, shoe salesmen and their customers, and even scientists dealing with radiation in their laboratories, accumulate in the course of years a considerably bigger dose than this although, in the governmental atomic installations themselves, great care is used to keep exposure much lower than this.

If persistent neglect of the consequences should lead to the general population's receiving a dose comparable to the above, generation after generation, indefinitely, as a combined result of military, medical, industrial and commercial uses, the results would in time be very noticeable. For in that case not only the frequency of genetic deaths but that of all hereditary weaknesses would finally rise appreciably. Though the effects from one generation's exposure are spread so far, in a layer so thin, they would in time become piled up in so many superposed layers, as at last to cause a doubling in the number of effects expressed per generation, to correspond with the doubled number of mutations constantly arising.

Our incautiousness in this matter makes it a good thing that doses of more than 600 roentgens usually result in sterility, and that, while means are being developed of mitigating radiation sickness, nevertheless the associated sterility can probably not be counteracted. For we are thereby provided with a fortunate defense which tends to protect the hereditary material of later generations from extreme contamination.

Now it has recently been discovered that, beyond the radiation sickness, there are much more delayed after-effects on the individual himself. These are elusive debilities that will cause him, on the average, to have a little shorter life span, perhaps six months less after 150 roentgens. It can be reckoned that the years thus lost either after atomic bombing or other widespread radiation exposure would be considerable—amounting in all to something like seventy million years if a population of the size of the United States was subjected uniformly to some 150 roentgens. This would be equivalent to some two million people having been killed outright. Nevertheless, it is easy to reckon that this number is probably smaller than the total number who would be killed in *subsequent* generations by the same dose, and considerably smaller than the number handicapped in subsequent generations. However, we are likely to take the danger to our own generation more seriously than that which is spread out over the future, and this too may help to protect our descendants.

We see then that the genetic effects produced by the exposure of only one or a few generations are, in themselves, far from being a threat to the existence of mankind or his civilization. Neither can they be of military value, being so remote. We certainly need not be afraid that our own children will, in the physical sense, be monsters. The induced mutations are only long-term debts which we would pass on lightly to posterity, who would rarely be able to single them out, and could never determine their source in any individual case in which they were singled out. No, it is "only" a question of some millions of lost and frustrated human lives, mostly scattered through the far future, and in our grandiose modern way we might consider this penalty cheap enough—for ourselves. But let us not merely close our eyes to the price, or deny it. We cannot, ethically, evade responsibility for the consequences of our actions merely by getting a long distance away from them, either in space or time. "Out of sight, out of mind" is hardly an excuse that our descendants will readily grant to us. Certainly the less fortunate among them will realize acutely that, for some of these misfortunes even though they cannot know which, we were the responsible agents. And they will blame us the more if their distant injuries had been produced rather in the cold blood of peace than in the heat of war. This stricture holds not only for those dealing with atomic energy and radioactive materials but for all other users of penetrating radiation, such as X-rays, whatever the immediate benefits of their practice may be, so long as they continue to allow this radiation to reach the reproductive organs in any considerable amount.

Radioactive Materials

Now, our foregoing estimates concerning the genetic effects of atomic warfare were based on the very unlikely premise that this was carried out mainly by means of bombing like that practiced at Hiroshima. There the chief effects were from the blast, and from the one intense but localized flash of radiation, but the radioactive materials themselves were mostly dissipated in the upper air. Vastly more menacing to human existence are the Bikini under water type of explosion, and any of the various other possible techniques whereby the deadly radioactive materials are methodically deposited over great areas. By such means a much higher average dose of radiation is caused to reach the general population, and not only far greater human damage to this generation must result, but many more mutations.

To be sure, even in this case, the hereditary damage, though so much greater, would as it were be quarantined, by the directly sterilizing and killing effects on those receiving doses above about 600 roentgens. This is a level which, for the production of mutations, is still relatively low. Thus far more people would be killed and far more of the survivors sterilized than by bombing of the Hiroshima type. Yet, if there were any people left to reproduce, these could in time repopulate the world with practically normal inhabitants, provided not too much long-lived radioactive material had been left about to keep corroding them.

It is likely that, in the technically less advanced regions of the world at least, there would be people left to reproduce. Let us hope that, on reaching their atomic age, they would not acquire the point of view that a few million dead and injured were negligible if they could not see them.

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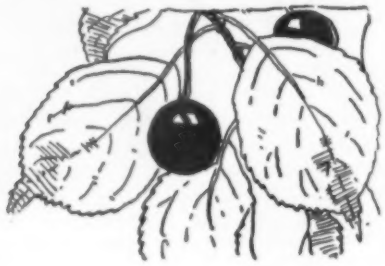

National Fruit

➤ CHERRIES, and especially cherry pies, have come to be conventional fixtures in the celebration of Washington's birthday. It is too bad, really, that the cherry motif wasn't saved for Independence Day, for cherries are ripe and ready for pie over a large part of the country for a few weeks on either side of July 4.

The cherry's status as an American national emblem, and the strong bid it makes for being the national choice of choices as a pie filling, are based, to be sure, on a little-boy legend about George Washington that nobody really believes any more, but (like many another beloved fiction) all the better liked for that. It is a curious thing how young George's reputation for unflinching truthfulness was based on a tale now known to be a pious fib, told by a "parson" whose title, never claimed by himself, was also fictitious. And to heighten the irony, "Parson" Weems never said that little George chopped the cherry tree down; the word he actually used in his saccharinely moralistic narrative was "bark'd."

Be that as it may, the sober fact that young George neither chopped down nor "bark'd" a cherry tree merely meant that his father had one more source of fine fruit. The Weems story describes the tree merely as an "English" cherry tree. This merely identifies it as an imported tree, for none of our cultivated cherries are derived from any of the wild cherries native to this continent.

The two principal stocks from which our orchard cherries come are, respectively, the sour-cherry species native to Asia Minor and perhaps southeastern Europe, and the sweet-cherry distributed over western Asia and Europe generally. Both kinds were brought to this country in Colonial times, so it is impossible to guess which one Weems meant when he called the senior Washington's tree "English."

The sour-cherry varieties are much more commonly planted than the choicer-fruited sweet cherries primarily because the trees are hardy under a wider range of climatic conditions, less "fussy" about what kind of soil they will grow in, and not so hospitable to insect pests as are the sweet cherries. And they do make must excellent pie.

Science News Letter, June 11, 1949

Sometimes one branch of an *apple tree* will bear apples twice as large as other branches; when noted they are used for scion wood to graft other trees, to produce the larger fruit.

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On This Week's Cover

➤ WHAT sound waves look like, if they could be seen by the naked eye, is no longer a mystery. They are made visible in pictures taken by a special photographic technique which also is used in studying air movement over airplane wing models in high-velocity wind tunnels. It is known as schlieren photography, and may be described as a method in which shadow pictures are obtained by rays of light, some of whose straight paths from source to camera plate have been interfered with by the movements in the air.

Scientists have found that there are similarities which exist in many instances between sound waves and light waves with respect to the phenomena of reflection, refraction, diffraction and interference. Dr. R. Bowling Barnes and Dr. Charles J. Burton have succeeded in developing visual methods for studying ultrasonic phenomena by the schlieren process. Ultrasonic waves are too high in pitch to be audible to the human ear, but they are now being applied to research work and industrial uses.

These scientists, now with the American Optical Society, Southbridge, Mass., did their ultrasonic work while with the American Cyanamid Company. A scientific report of their findings is given in the JOURNAL OF APPLIED PHYSICS (March)

Science News Letter, June 11, 1949

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• Books of the Week •

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ALA CATALOGING RULES FOR AUTHOR AND TITLE ENTRIES—Clara Beetle, Ed.—*American Library Association,* 2nd ed., 265 p., $5.00. An expansion and revision of the rules of entry and heading of the 1908 edition.

BIOLOGY OF THE VERTEBRATES: A Comparative Study of Man and His Animal Allies—Herbert E. Walter and Leonard P. Sayles—*Macmillan,* 3rd ed., 875 p., illus., $6.00. A textbook thoroughly revised to include all the latest material.

BIRDS: A GUIDE TO THE MOST FAMILIAR AMERICAN BIRDS—Herbert S. Zim and Ira N. Gabrielson—*Simon and Schuster,* 157 p., illus., $1.00. A beautifully illustrated book with 118 paintings in full color with all necessary data for bird recognition.

CALCULUS—Lloyd L. Smail—*Appleton-Century-Crofts,* 592 p., illus., $4.50. An introductory text.

CAROB CULTURE IN THE SEMI-ARID SOUTHWEST—J. Eliot Coit—*Walter Rittenhouse,* 16 p., illus., paper, free upon request to publisher, 4575—58th St., San Diego 5, Calif. Telling how to get food from a bean-bearing tree, thus aiding soil conservation.

THE COMMON FORM OF JOINT DYSFUNCTION. Its incidence and treatment—William Kaufman—*Hildreth,* 208 p., illus., $8.75. Methods of study and treatment based upon clinical observations.

COPPER IN CALIFORNIA: Bulletin 144—Olaf P. Jenkins—*Division of Mines, California,* 429 p., illus., $6.00. A detailed report on the Foothill Copper Belt including economics and treatment of ores and statewide tabulations of copper properties. The study is well illustrated with nine pages of photographs and 52 plates folded in a separate box which accompanies the book.

FIELD MANUAL OF PLANT ECOLOGY—Frank C. Gates—*McGraw-Hill,* 137 p., illus., $3.00. For the beginning student and based on the author's teachings at the University of Michigan, Edmund W. Sinnott is the consulting editor.

FLORA OF PERU—J. Francis MacBride—*Field Museum of Natural History,* 777 p., paper, $2.00. A monograph reporting data collected by the author.

HANDBOOK OF PATENTS—Harry Aubrey Toulmin, Jr.,—*Van Nostrand,* 800 p., illus., $9.00. A reference book covering the essentials of patent law, simply written for busy people.

INDIVIDUAL BEHAVIOR: A New Frame of Reference for Psychology—Donald Snygg and Arthur W. Combs—*Harper.* Providing the student or patient with a new way of interpreting his own behavior.

A LABORATORY MANUAL FOR ELEMENTARY ZOOLOGY—W. Byers Unger and C. E. Moritz—*Ginn,* rev. ed., 182 p., $2.25. For college elementary classes.

THE NATURAL HISTORY OF MOSQUITOES—Marston Bates—*Macmillan,* 379 p., $5.00. A report on the development of the mosquito and its relations to other organisms. The bibliography will serve as a guide to the vast and scattered literature on mosquito biology.

PRENATAL CARE—Ann DeHuff Peters—*Gov't. Printing Office,* 76 p., illus., paper, 15 cents. A competely rewritten up-to-date edition of this practical guide for parents, prepared by the Division of Research in Child Development. Parents and professional workers may obtain single copies of this booklet free of charge from the Children's Bureau, Washington 25, D. C.

RANGE-FINDINGS TESTS: TOXICOLOGICAL CONTROL IN NEW PRODUCT DEVELOPMENT—H. F. Smyth, Jr.,—*Mellon Institute,* 3 p., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa.

A REVIEW FOR 1948—Chester I. Barnard—*The Rockefeller Foundation,* 71 p., illus., paper, free upon request to publisher, 49 West 49th St., New York. The annual report containing information on research projects in various fields.

SHRUBS AND VINES FOR AMERICAN GARDENS—Donald Wyman—*Macmillan,* 442 p., illus., $7.50. A practical guide to the selection of better types of shrubs and vines.

Science News Letter, June 11, 1949

In Louisiana, the cigarette buyer pays the nation-wide federal tax of seven cents a pack and a state tax of eight cents; 39 states now levy *tobacco taxes* and $374,000,000 were collected to enrich state treasuries in 1948.

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SQUARE COOKER, a small frying pan, turns out an egg or a hamburger in a shape to fit the square slices of a sandwich loaf of bread. Made of heavy cast aluminum construction, with a heavy cover and a no-heat handle, it can be used for cooking individual portions of many foods.

Science News Letter, June 11, 1949

LAMPLESS INFRA-RED heating unit, an improved type, costs less than lamp or strip heater equipment, and is claimed to be more efficient than any type of strip heater. In its construction, Pyrex tubes with spiral channel resistors are used, together with stainless steel contacts and stainless steel reflectors.

Science News Letter, June 11, 1949

CRIB GUARD is a plastic rod the length of the toddler's bed that is held firmly in place by chromium-plated metal supports, attached to the upper rail of the crib's drop-side, about six inches above the rail. The easily cleaned plastic used in the rod can not chip or peel even if chewed.

Science News Letter, June 11, 1949

CAP LAMP for miners, improved type shown in the picture, gives 25% more light

than earlier lamps and can be focused for near or far distances without disassembling the headpiece. It uses a four-cell battery design, encased in a molded nylon plastic container, which will assure satisfactory light during an entire working shift.

Science News Letter, June 11, 1949

SPRAYER-DUSTER, for the distribution of insecticides on farm crops or city trees, is a complete unit, with an axial-flow blower, gasoline engine and tanks for the insecticide solution or dust, that uses turbulent air to atomize and spread the material. It is mounted in any light truck or comes on a two-wheel trailer.

Science News Letter, June 11, 1949

MOISTURE METER, to show when lawns or gardens are watered to the proper depth, consists of a probe to push into the soil to the desired depth, and a flag which elevates when the moisture has reached the probe end. A stainless steel spring, to push the flag up, goes into action when the water reaches it.

Science News Letter, June 11, 1949

GARMENT for creeping babies has a panty part lined with a lightweight, waterproof, stain-resistant vinylite plastic film which assures complete protection and helps do away with laundry problems. This soft knitted cotton garment is fastened by snaps, making a changing job easy.

Science News Letter, June 11, 1949

Do You Know?

Natural waxes may be of animal, insect, mineral or vegetable origin.

Kansas in 1948, produced 18% of the entire American *wheat crop*.

The leaves of some 75,000,000 Brazilian carnauba trees must be gathered each year to yield the 25,000,000 pounds of *carnauba wax* produced annually.

Isolated fertile valleys in Norwegian mountain areas, formerly used only for summer pastures because there were no roads by which farm machinery could reach them, now promise to become resident farms, thanks to the *bulldozer*.

The so-alled *spitting cobra* is a dangerous snake because it not only can bite but it can spit venom a short distance through the air.

The 4.33-mile *San Francisco-Oakland Bay* bridge, said to be the longest in the world, consists of a combination of a cantilever-truss span and two complete suspension bridges placed end to end.

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